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EXAMINER	
DUDEK JR, EDWARD J	
ART UNIT	PAPER NUMBER
2186	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/694,115	AMIR ET AL.	
	Examiner	Art Unit	
	Edward J. Dudek	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-91* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37,39-49,54,55,57-67,69-79 and 87-91* is/are rejected.

7)☒ Claim(s) *38, 50-53, 56, 68, and 80-86* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/09/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office action is responsive to the application filed on 27 October 2003.

Claims 1-91 have been presented for examination.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "220" in figure 3 has been used to designate both the incoming packets and outgoing frames. Reference character "710" in figure 7 has been used to identify the first and second data chunks. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 420-A, 420-B, and 420-C. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office

action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 720 (see bottom of page 14 and page 15). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

Page 11, line 10 refers to the Data Manager (e.g. DM) module as element 330, when it should be element 360.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the limitation "said physical commands" in line 1. There is insufficient antecedent basis for this limitation in the claim. For purposes of this Office action, the claim will be construed as being dependant on claim 19, therefore resolving the deficiency.

Claims 22-26 are also deficient for the same reasons set forth above, as they depend from claim 21.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 62-91 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 62 is directed toward functional descriptive language (e.g. computer executable code). The code itself is not a process, and since there is no combination with a computer readable medium, there is no way for the code to impart functionality on a computer and realize the functionality of the method.

Claims 63-91 are also deficient for the same reasons set forth for claim 62.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-10, 13-20, 27-37, 39-43, 48-, 54-55, 57-67, 69-73, 78, and 87-91 are rejected under 35 U.S.C. 102(e/a) as being anticipated by Kumar et al (U.S. Patent Application Publication #2003/0131182).

Referring to claim 1: Kumar teaches a virtualization switch for performing a plurality of virtualization services within a data path said virtualization switch comprises

at least: a network interface (NI) (see [0055], lines 11-13); an iSCSI module (see [0046], lines 12-15); a target manager (TM) (see [0056], lines 1-6); a volume manager (VM) (see [0059]); a data transfer arbiter (DTA) (see [0060]); a device manager (DM) (see [0051]); a plurality of input ports to receive incoming packets from a network (see [0036]); and, a plurality of output ports to communicate with plurality of storage devices (see [0036]).

Referring to claim 2: said virtualization switch is capable of operating in at least one of: storage area network (SAN), network attached storage (NAS) (see [0035]).

Referring to claim 3: said data path is established between a host and said storage devices (see [0012], lines 1-7).

Referring to claim 4: virtualization services comprise at least one of: mirroring, remote mirroring over a slow link, snapshot, data replication, striping, concatenation, periodic local and remote backup, restore (see [0045]).

Referring to claim 5: said network is at least one of: local area network (LAN), wide area network (WAN), geographically distributed network (see [0040]).

Referring to claim 6: said storage device is at least one of: tape drive, optical drive, disk, sub-disk, redundant array of inexpensive disks (RAID) (see [0048).

Referring to claim 7: said input ports are capable of carrying packets in accordance with a transport protocol (see [0055]).

Referring to claim 8: said transport protocol is at least one of: Fiber Cannel (FC), parallel small computer system interface (SCSI), internet small computer system

interface (iSCSI), transmission control protocol (TCP)/internet protocol (IP), Infiniband (see [0055], lines 11-13).

Referring to claim 9: said output ports are capable of carrying packets in accordance with a transport protocol (see [0061]).

Referring to claim 10: said transport protocol is at least one of: Fiber Cannel (FC), parallel SCSI, iSCSI, TCP/IP, Infiniband (see [0061], lines 17-20).

Referring to claim 13: said TM comprises instructions for the purpose of: handling incoming logic commands (see [0059]); and, scheduling the execution of said incoming logic commands (see [0060]).

Referring to claim 14: said logic command refers to a virtual volume and a virtual address space (see [0056]).

Referring to claim 15: said logic command is at least SCSI command (see [0063]).

Referring to claim 16: said TM further comprises a plurality of host-logical unit (LU) queues, wherein each of said host-LU queue contains said logic commands requested to be executed by said host on said LU (see [0060]).

Referring to claim 17: said LU comprises a plurality of contiguous partitions of storage space on said storage device (see [0045]).

Referring to claim 18: said DTA is capable of handling data transfer between said storage devices and hosts (see [0060]).

Referring to claim 19: said VM is capable of translating a logic command to a list of physical commands (see [0056] and [0057]).

Referring to claim 20: each of said physical commands includes at least: a physical address of a single storage device (see [0057]).

Referring to claim 27: said DM comprises at least: a list of target paths; and, a list of LU paths associated with each of said target paths (see [0067]).

Referring to claim 28: each of said target paths defines a connection between said virtualization switch and one of said storage devices, via one of said output ports (see [0063]).

Referring to claim 29: wherein said DM further comprises a plurality of storage drivers for communicating with said plurality of output ports (see [0060]).

Referring to claim 30: said virtualization switch further provides a bridge mechanism for transferring data without performing said virtualization services (see [0037]).

Referring to claim 31: said virtualization switch is further capable of reporting on error generated by virtual volumes (see [0045]).

Referring to claims 32 and 62: Kumar teaches a method for performing a plurality virtualization services, said method being further operative to perform said virtualization services within a data path, said method comprises the steps of: a) receiving a logic command to be performed on at least one virtual volume, said logic command including at least a virtual address (see [0055]); d) scheduling said logic command for execution (see [0060]); c) translating, in one pass, said logic command to a list of physical commands, wherein each of said physical commands is targeted to a different storage

device (see [0056] and [0057]); d) determining the amount of data to be transferred via a network (see [0060]); and, e) executing said physical commands on said storage devices (see [0061]).

Referring to claims 33 and 63: said virtualization services comprise at least one of: mirroring, remote mirroring over a slow link, snapshot, data replication, striping, concatenation, periodic local and remote backup, restore (see [0045]).

Referring to claims 34 and 64: said data path is established between a host and said storage devices (see [0012], lines 1-7).

Referring to claims 35 and 65: said storage device is at least one of: a tape drive, optical drive, disk, sub-disk, redundant array of inexpensive disks (RAID) (see [0048]).

Referring to claims 36 and 66: said logic command is at least a SCSI command (see [0063]).

Referring to claims 37 and 67: the following steps comprise receiving said logic command: a) initiating an iSCSI session with an initiator host (see [0067]); b) receiving said logic command from said initiator host (see [0056]); c) parsing said logic command to determine at least said virtual address and said logic command's type (see [0056]); d) performing a check to determine if said logic command is valid (*it is inherent that the system would check the logic commands validity, since it would not be able to process an invalid command*); e) generating a response command if said logic command is invalid, otherwise, adding said logic command to a host-LU queue (see [0060]); and, f) generating a data transfer request (see [0059]).

Referring to claims 39 and 69: said response command comprises an iSCSI service response code indicating the type of a generated error (see [0046], *since the host is talking to the target using the iSCSI protocol it would be inherent that the messages sent between the two would be iSCSI codes*).

Referring to claims 40 and 70: said host-LU queue comprises logic commands requested to be executed by said host on said LU (see [0060]).

Referring to claims 41 and 71: scheduling said logic command for execution further comprises the step of: selecting said logic command to be executed from said host-LU queue (see [0060]).

Referring to claims 42 and 72: the selection is performed using at least one of the following selection algorithms: recently used, round robin, weighted round robin, random, least loaded LU (see [0060]).

Referring to claims 43 and 73: said command type is a read command (see [0058]).

Referring to claims 48 and 78: said command type is a write command (see [0058]).

Referring to claim 54: said physical commands are constructed in a data structure (see [0056], *the commands are within a data frame*).

Referring to claim 55: said data structure further includes at least one of: an alternative command link, a pointer to said storage device (see [0057], *the physical address points to the location of the physical device*).

Referring to claims 57 and 87: translating said logic command to said list of physical commands is performed using a mapping schema (see [0057]).

Referring to claims 58 and 88: said mapping schema defines relations between virtual volumes, logical units (LUs), and said storage devices (see [0057]).

Referring to claims 59 and 89: upon completing the execution of said physical commands further comprises the steps of: a) removing said logic command from the host-LU queue; b) sending to the initiator host a response command, said response command signals the end of execution (see [0060], *it is inherent that the command would be removed from the queue after is it sent to the storage device and executed*).

Referring to claims 60 and 90: said method is further capable to perform operations on said virtual volumes that do not require any data transfer (see [0070]).

Referring to claims 61 and 91: said method is further capable of reporting on errors generated by virtual volumes (see [0045]).

Claims 32-36 and 62-66 are rejected under 35 U.S.C. 102(e/a) as being anticipated by Ibrahim et al (U.S. Patent Application Publication #2003/0149848).

Referring to claims 32 and 62: Ibrahim teaches a method for performing a plurality virtualization services, said method being further operative to perform said virtualization services within a data path, said method comprises the steps of: a) receiving a logic command to be performed on at least one virtual volume, said logic command including at least a virtual address (see [0024]); d) scheduling said logic command for execution (see [0027]); c) translating, in one pass, said logic command to

a list of physical commands, wherein each of said physical commands is targeted to a different storage device (see [0025]); d) determining the amount of data to be transferred via a network (see [0032]); and, e) executing said physical commands on said storage devices (see [0029]).

Referring to claims 33 and 63: said virtualization services comprise at least one of: mirroring, remote mirroring over a slow link, snapshot, data replication, striping, concatenation, periodic local and remote backup, restore (see [0043]).

Referring to claims 34 and 64: said data path is established between a host and said storage devices (see [0021]).

Referring to claims 35 and 65: said storage device is at least one of: a tape drive, optical drive, disk, sub-disk, redundant array of inexpensive disks (RAID) (see [0021]).

Referring to claims 36 and 66: said logic command is at least a SCSI command (see [0034]).

Claims 44-46 and 49 are rejected under 35 U.S.C. 102(e) as being anticipated by Kumar et al (U.S. Patent Application Publication #2003/0131182) and "iSCSI packet ordering" hereinafter referred to as iSCSI.

Referring to claims 44-45, and 49: Kumar teaches all the limitations of claims 32,37, and 43 as discussed above, however, Kumar does not explicitly teach determining the amount of data to be transferred using an available space parameter. However, the system taught by Kumar does use the iSCSI protocol (see [0046]), and

iSCSI shows that iSCSI packet contain a data segment length field, which would let the target know how much data is being transferred.

Referring to claim 46: Kumar already teaches the following steps comprise executing said physical commands on said storage devices: a) accessing a storage device using a physical address (see [0057]); b) retrieving from said accessed storage device the number of bytes designated in said available space parameter (see [0060]); c) sending the retrieved data to said host (see [0060]); and, d) repeating said steps a) through d) until all requested data is read from said storage devices (see [0060]).

Claim 47 is rejected under 35 U.S.C. 102(e) as being anticipated by Kumar et al (U.S. Patent Application Publication #2003/0131182) and "RAID".

Referring to claim 47: Kumar teaches all the limitations of claim 46 as discussed above, however, Kumar does not explicitly teach the physical commands being executed in parallel. Kumar does teach a system that uses a RAID configuration (see [0045]). RAID teaches that data is spread across the disks, and RAID systems utilize parallel reads and writes. Therefore, since the system taught by Kumar utilizes RAID configurations for the storage, some of the physical commands would be performed in parallel.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar et al (U.S. Patent Application Publication #2003/0131182) in view of "Understanding TCP/IP" (Cisco systems 1992-2002) hereinafter referred to as TCP/IP.

Referring to claim 11: Kumar teaches all the limitations for claim 1 as discussed above, however, Kumar fails to explicitly teach the use of a TCP/IP stack. TCP/IP uses a stack where data from the host is passed down the stack, where the lower layers will transfer the data across the network, to the target, where the target will move the data up the stack to determine what was sent (see pages 3 and 4). It would have been obvious to implement a TCP/IP stack, in the system taught by Kumar, since a TCP/IP stack is used to interpret what data was sent by the host, as taught by TCP/IP, and Kumar does interpret the data that was sent (see [0055]).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar et al (U.S. Patent Application Publication #2003/0131182) in view of "iSCSI Q&A", hereinafter referred to as iSCSI.

Referring to claim 12: Kumar teaches all the limitations of claim1 as discussed above, however, Kumar does not explicitly teach the use of a iSCSI stack. iSCSI teaches that the use of iSCSI allows a large installed base of storage devices to be accessed by multiple users over and IP network (see page 1, section 4). It would have been obvious to a person having ordinary skill in the art to which said subject matter

pertains to have implemented an iSCSI stack, as taught by iSCSI, in the system taught by Kumar, to enable access to a large installed base of storage devices, and to allow the switch taught by Kumar, to process iSCSI commands, which the switch does do (see [0069]).

Allowable Subject Matter

Claims 38, 50-53, 56, 68, 80-83, and 84-86 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 21-26 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward J. Dudek whose telephone number is 571-270-1030. The examiner can normally be reached on Mon thru Thur 7:30-5:00pm Sec. Fri 7:30-4 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edward Dudek
December 19, 2006

PIERRE BATAILLE
PRIMARY EXAMINER